

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, D.C. 20554

ORIGINAL

In the Matter of )  
 )  
Revision of the Commission's Rules to Ensure )  
Compatibility with Enhanced 911 Emergency )  
Calling Systems )

CC Docket No. 94-102  
DA 99-1049

**RECEIVED**

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To: Chief, Wireless Telecommunications Bureau

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

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**REPLY COMMENTS OF AIRTOUCH COMMUNICATIONS, INC.**

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**REPLY COMMENTS OF AIRTOUCH COMMUNICATIONS, INC.**

AirTouch Communications, Inc. ("AirTouch"), on behalf of its subsidiaries and affiliates, hereby replies to those comments submitted in response to the Commission's *Public Notice*, dated June 1, 1999, seeking targeted comment on Phase II Automatic Location Identification ("ALI") standards for handset-based approaches and related issues.<sup>1</sup> AirTouch also addresses information disseminated at the Wireless Telecommunications Bureau's recent technical roundtable discussion on implementation of Phase II ALI.<sup>2</sup>

**INTRODUCTION AND SUMMARY**

The comments and the technology roundtable highlight the fact that neither network nor handset solutions are currently available for all situations, and that there are problems associated

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<sup>1</sup> See *Public Notice*, CC Docket No. 94-102, *Wireless Telecommunications Bureau Requests Targeted Comment on Wireless E911 Phase II Automatic Location Identification Requirements*, DA 99-1049 (June 1, 1999) (*Notice*).

<sup>2</sup> See, e.g., *Public Notice*, CC Docket No. 94-102, *Commission Announces Details of Technical Roundtable on Implementation of Automatic Location Identification for Enhanced 911 Technologies*, DA 99-1243 (June 23, 1999).

with all proposed solutions.<sup>3</sup> For example, there are difficult implementation and technology issues to resolve, and how networks are deployed now and in the future will affect which solution might work best in a given environment. Testing and cost issues are also unresolved, to date. Although AirTouch has not selected a particular solution, the record continues to reflect that a handset solution is an attractive option, particularly for carriers who rely upon CDMA technology.<sup>4</sup> One thing is clear — at this point, there is insufficient information to “close the door” on any particular solution, and further testing using a uniform protocol to measure results consistently across solutions is required.<sup>5</sup>

Thus, AirTouch agrees strongly with those commenters who argue that the Commission’s rules must remain flexible to give carriers and the consumers they serve a choice of solutions by which to attain compliance. For this reason, and as stated in AirTouch’s previous filings, AirTouch respectfully requests that the Commission grant the pending waiver requests, or modify Section 20.18(e), to give carriers the flexibility to choose handset-based or hybrid Phase II ALI solutions, as well as network-based solutions, based upon the systems they have in place and what will best serve their customers. The public interest would be served by such Commission action.

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<sup>3</sup> See, e.g., Comments of Sprint Spectrum L.P. (“Sprint PCS”) at 4.

<sup>4</sup> See Comments of Sprint PCS at 1. Integrated Data Communications (“IDC”), which works closely with public safety groups, also reported very promising initial handset test results at the roundtable discussion.

<sup>5</sup> In this regard, AirTouch agrees with ALLTEL that there has been insufficient solid data and testing to adopt a particular solution. See Comments of ALLTEL Communications, Inc. (“ALLTEL”) at 2; see also discussion *infra* at Section II.

## DISCUSSION

### I. CARRIERS AND OTHERS AGREE THAT THE COMMISSION'S RULES SHOULD BE FLEXIBLE ENOUGH TO ALLOW MULTIPLE ALI SOLUTIONS

The comments reflect near uniform agreement among carriers and others that the Commission should not take any action that would preclude a particular Phase II ALI solution, or skew the competitive landscape in favor of one solution over another.<sup>6</sup> Rather, the Commission's rules must be both technology neutral and flexible enough to accommodate new solutions to achieving Phase II capability.<sup>7</sup> Given the often conflicting record on the merits of network, handset, or hybrid solutions, and in what environments (*e.g.*, AMPS, TDMA, CDMA, GSM) each will best perform, it is essential that the Commission allow carriers the flexibility and the option to choose which solution will best enable them to serve their subscribers in accordance with the Commission's E911 rules.<sup>8</sup> Removing that choice at this early date could impose unworkable solutions on carriers that will not enable them to meet the requirements of Section 20.18(e). Obviously, this could have undesirable results on public safety.

While most carriers emphasize that they have not yet selected a particular solution, they generally agree that a phased-in approach is required for any handset solution to be viable.<sup>9</sup> Any

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<sup>6</sup> See, *e.g.*, Comments of AT&T Wireless Services, Inc. ("AT&T") at 1; ALLTEL at 2; Cellular Telecommunications Industry Association ("CTIA") at 3.

<sup>7</sup> See Comments of Sprint PCS at 1-2; U S West Wireless, L.L.C. ("U S West") at 1; Rural Cellular Association ("RCA") at 3; *see also* Comments of Personal Communications Industry Association ("PCIA") at 3.

<sup>8</sup> See Comments of AT&T at 1; ALLTEL at 3; Sprint PCS at 3; PCIA at 3; U S West at 1.

<sup>9</sup> See, *e.g.*, Comments of U S West at 1; Ameritech at 3.

penetration or deployment benchmarks must be tied to release of an order and equipment availability,<sup>10</sup> both of which are beyond the control of carriers. Moreover, carriers urge the Commission to allow good faith efforts to meet benchmarks, rather than viewing them as mandates.<sup>11</sup> As Western Wireless Corp. (“Western Wireless”) noted at the roundtable discussion, such action is consistent with the European model, where carriers implementing E911 technologies are held to a “best efforts” standard, not a mandate. In using best efforts to meet any benchmarks which the Commission imposes, carriers will clearly engage in marketing and promotional efforts.<sup>12</sup> AirTouch again submits that carriers choosing a handset solution are incented to quickly deploy ALI-capable handsets in their markets.

Carriers also agreed with AirTouch that a commitment by carriers to have 99% or 100% of the handsets in use of their system ALI compatible by a specific date is not feasible because of customer choice issues.<sup>13</sup> As AT&T notes, “[n]o matter how aggressively a carrier implements its replacement program or how generous a subsidy a carrier offers its customers to trade in their old handsets, there will always be a certain number of customers that choose to retain their old handsets.”<sup>14</sup> Accordingly, a 90% utilization schedule is more realistic and will reflect virtual deployment based upon customer choice and other issues.<sup>15</sup>

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<sup>10</sup> See Comments of U S West at 3; PrimeCo Personal Communications, L.P. (“PrimeCo”) at 5; Sprint PCS at 3 n.7; SnapTrack, Inc. (“SnapTrack”) at 11-15.

<sup>11</sup> See Comments of U S West at 4; Ameritech at 4; PrimeCo at 3-4.

<sup>12</sup> See Comments of Ameritech at 4.

<sup>13</sup> See Comments of PrimeCo at 5.

<sup>14</sup> See Comments of AT&T at 2.

<sup>15</sup> AirTouch suggested in its comments that a 90% penetration benchmark in Year 5 is an attainable goal, assuming certain underlying assumptions are met. See Comments of AirTouch at 10-12.

Further, carriers believe that the roamer issue is small and can be minimized.<sup>16</sup> For handset-based subscribers roaming in a network-based market, they will still be able to receive the benefits of the network's Phase II ALI. Conversely, because many major manufacturers, including Motorola, Inc., Texas Instruments Incorporated, and QUALCOMM Inc., are expected to include ALI technology as a standard feature in all handsets they sell in the future, a network-based roamer will still likely have a handset capable of enabling the provision of Phase II ALI even when roaming in handset-based markets.<sup>17</sup>

Even in the case of a network-based roamer who owns a legacy handset that is not Phase II ALI-capable, roaming concerns are not likely to be material. The comments and the roundtable discussion show that the matter should be transitory, since handset churn is expected to be rapid, with customers averaging a new phone approximately every three years.<sup>18</sup> As AirTouch noted in its comments, this is a time of rapid change and feature enhancement to handsets,<sup>19</sup> which should help spur this churn. SiRF Technology, Inc. ("SiRF") echoed this sentiment at the roundtable, noting that new ALI handsets will be attractive to consumers because, in addition to their E911 safety features, they will contain other new location capabilities sought by consumers. For CDMA carriers like AirTouch, Ericsson Inc. ("Ericsson") notes that the impact on legacy handsets is expected to be particularly minimized, because CDMA handsets have considerable processing capability, and therefore the incremental cost of adding GPS to new handsets is limited.<sup>20</sup>

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<sup>16</sup> See Comments of Sprint PCS at 5; PrimeCo at 6.

<sup>17</sup> See Comments of SnapTrack at 18-19.

<sup>18</sup> See Comments of Sprint PCS at 5; *see also* Comments of PrimeCo at 6.

<sup>19</sup> See Comments of AirTouch at 14.

<sup>20</sup> See Comments of Ericsson at 3.

Finally, carriers are also united in agreeing that the Commission should not mandate retrofitting or replacement efforts.<sup>21</sup> They showed that such efforts are unnecessary given handset churn and mass production of ALI-capable handsets.<sup>22</sup> Moreover, the record shows that imposing obligations to retrofit or replace legacy handsets could also penalize smaller carriers who may not receive the benefit of discounts generally reserved for bulk purchases.<sup>23</sup> Several carriers also agreed with AirTouch that the Commission should consider the example of airbags, in which the government did not mandate a retrofit or replacement as long as the equipment was made available.<sup>24</sup> Consumer acceptance and purchase of airbags occurred much more quickly and at significantly higher rates than anticipated. There is good reason to expect similar results will occur with respect to ALI-capable handsets.

## **II. BECAUSE OF CONFLICTING CLAIMS AS TO TECHNOLOGICAL AVAILABILITY AND ACCURACY OF ALI SOLUTIONS IN DIFFERENT ENVIRONMENTS, UNIFORM TESTING AND REPORTING IS NECESSARY**

While AirTouch is committed to examining both network and handset solutions, or hybrids of both, it has not received sufficient consistent data from vendors, particularly network vendors, addressing its accuracy concerns in differing environments. AirTouch strongly believes that network overlay vendors must give more concrete information concerning the performance of

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<sup>21</sup> See Comments of PCIA at 5; Ameritech at 3; BellSouth Corporation (“BellSouth”) at 6.

<sup>22</sup> See, e.g., Comments of Sprint PCS at 7.

<sup>23</sup> See Comments of RCA at 4. Mandatory upgrades may also have the effect of penalizing those customers not able to afford a new or retrofitted handset, thereby pricing them out of the market in contravention of the public interest. See Comments of AirTouch at 16.

<sup>24</sup> See Comments of Sprint PCS at 7; BellSouth at 6.

network solutions with different types of system configurations and their associated costs,<sup>25</sup> in order to assure carriers that network solutions will perform to the required accuracy in each environment, and AirTouch would welcome Commission assistance in this regard.

Specifically, based upon the variety of, at times, conflicting claims made by both network and handset vendors in the comments and at the technology roundtable, AirTouch believes that there is a need for standardized testing and reporting protocol by which to evaluate all solutions. AirTouch suggests that tests be conducted and reported in accordance with the overall test plan developed by the CDG Location Forum's Test Criteria Group. The Test Criteria Group includes TruePosition, Inc. ("TruePosition"), U.S. Wireless Corporation ("U.S. Wireless"), and other network overlay representatives, as well as representatives of differing handset solutions, and thus AirTouch believes it is a balanced and fair test reporting mechanism.

AirTouch notes that SnapTrack has recently completed and reported tests in accordance with this protocol, and the Company looks forward to reviewing similar test results prepared by the network overlay vendors in order to make a balanced and informed decision concerning which solution will best meet its needs and comply with the Commission's mandate. As noted at the roundtable discussion, AirTouch to date has not seen anything conforming to the CDG test plan by network vendors, despite putting out a Request for Information ("RFI") one month ago, and accordingly would welcome the FCC requesting this information on a voluntary basis.<sup>26</sup>

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<sup>25</sup> AirTouch has also sought costing information from handset vendors. While AirTouch is cognizant of the proprietary issues associated with the release of cost information, costs play an important role in the choice of a Phase II solution, particularly for cost recovery purposes. Thus, cost data is essential.

<sup>26</sup> During the roundtable, most network vendors stated that they had not conducted tests in accordance with the CDG protocol, but would be willing to do so.

Moreover, while network overlay operators and vendors reference extensive testing in their comments, there are few if any specific cites as to which tests they are referring to and under what circumstances and environments they were conducted. As noted below, AirTouch is extremely concerned about the reliability and accuracy of network solutions for CDMA carriers, like AirTouch, and vendors have been unclear about which systems (AMPS, TDMA, CDMA, *etc.*) are addressed by the tests that they have conducted to date.<sup>27</sup>

In particular, AirTouch notes that the level of network testing for CDMA systems conducted to date has been minimal, despite the fact that there are substantial concerns associated with the viability of a network solution in a CDMA environment, as the roundtable discussion revealed. As noted by U S West, there are no commercially available Phase II ALI solutions available today for CDMA networks.<sup>28</sup>

The responses of the network vendors at the roundtable reflect this essential fact. For example, U.S. Wireless recognized that CDMA is more complex than other standards. KSI and TruePosition indicated that their testing of network solutions in a CDMA environment is still in development. TruePosition also admitted that most of its testing is not with CDMA. SigmaOne Communications (“SigmaOne”) stated that network solutions can work with CDMA, but that they

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<sup>27</sup> See, e.g., Comments of U.S. Wireless at 6 (referring to only “published test results” without citation); Radix Technologies, Inc. (“Radix”) at 1, 3 (referencing field trials and technology demonstrations, and stating network-based ALI solutions exist for all cellular formats, including CDMA, without further support); TruePosition at 15-16 (discussing trials in Houston and Philadelphia, without reference to test methodology, reporting methods, or applicability to different systems, like CDMA); KSI, Inc. (“KSI”) at 1-2 (referencing field tests and live demonstrations for AMPS and TDMA, without citation or mention of CDMA); see also *Ex Parte* of METROCOM.COM, Inc. (“METROCOM”) at 4 (stating that no field trials have been conducted with any carriers, to date).

<sup>28</sup> See Comments of U S West at 2-3.

may require three sites to triangulate caller location, which is not available in many rural areas. Conversely, SnapTrack and SiRF indicated that their handset solutions support CDMA standards, as supported by SnapTrack's recently-released test results.

The problems with a CDMA network solution were highlighted by AirTouch inquiries at the recent Commission roundtable. For example, because of the spectrally-efficient technology upon which CDMA is based, there are concerns that an E911 call may not be locatable if the caller is too close to a given cell site in a CDMA market using a network solution. TruePosition admitted at the roundtable that with a network solution in a CDMA market, there will be problems with location capability in the immediate vicinity of a cell site; this is not the case with a TDMA or AMPS system. TruePosition's solution to the problem is to state that Phase I will always be available in those instances,<sup>29</sup> but it recognized that this was "no question a weakness" for network solutions. For its part, Ericsson also recognized that because of the significant difficulties with CDMA-network compatibility, handset solutions may be the best solution for CDMA carriers. Specifically, Ericsson states that:

[G]iven the wireless technologies used by CMRS carriers, CDMA presents the strongest case for deployment of handset-based positioning systems. While deployment of a network-based solution is possible for CDMA systems, *such a solution would cause a significant degradation in the quality of service for other subscribers each time an emergency call is made.*<sup>30</sup>

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<sup>29</sup> Interestingly, this statement is at odds with arguments made by network vendors that Phase I is not sufficient for the limited cases of legacy handsets that will not have ALI capability in a market using a handset solution.

<sup>30</sup> See Comments of Ericsson at 3 (emphasis added).

With these concerns, Ericsson's comments do point to the need for additional testing and reporting of the viability of network solutions in a CDMA environment.<sup>31</sup> It is important for the Commission to recognize that the conclusion drawn from further testing may be that different solutions work better in different environments, and that there may not be a "one size fits all" answer to the problem.

It is also important to consider how a particular Phase II ALI technology solution will perform in the near future and beyond. Given the evolution in base stations, antenna technologies and configurations (*e.g.*, cross-polarization and/or antenna clustering), and changes in Radio Transmission Technologies ("RTT"), including third generation technologies such as CDMA 2000 1X, which could be deployed in the network by October 1, 2001, and CDMA 2000 3X, which could be deployed in the next 5-7 years, ALI capabilities must be evaluated in a number of environments.<sup>32</sup> Again, it appears that little testing has been conducted to address these concerns. Many of these new technologies, such as the use of cross-polarized antennas, are now used by PCS carriers, and should

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<sup>31</sup> AirTouch is also concerned that there is no available data concerning how great the problem of close proximity to a cell site is in a CDMA environment.

<sup>32</sup> Sprint PCS has noted that a GPS handset approach appears to provide a "superior and more cost effective solution" in both the short and long terms. *See* Comments of Sprint PCS at 3.

increasingly be adopted by other carriers.<sup>33</sup> To AirTouch's knowledge, however, little if any network solution testing has been conducted with PCS carriers on their systems.<sup>34</sup>

AirTouch agrees with those concerns expressed at the Commission roundtable discussion that network solutions are as yet unproven with regard to these new technologies. Although network vendors indicated at the roundtable discussion that problems have not yet arisen in the limited controlled testing done to date, this does not mean that it is not a significant issue for carriers now and particularly in the future. Carriers seek assurances that a network solution will be compatible with these new technologies. Accordingly, testing in the real world — not just in a controlled environment — is necessary to allow carriers to evaluate the viability of network solutions.

AirTouch also agrees with Nortel Networks' ("Nortel") concern expressed at the roundtable with regard to triangulation, and the problems associated with it in rural areas using linear cell site coverage along highways. Despite representations that network solutions can locate callers with only 2 or even 1 cell site, Nortel estimates that there is a 30% incremental increase in cost to locate a caller with only 2 cell sites. This could present further concerns for a network solution. Nortel requests additional data concerning the yield, accuracy and costs associated with locating callers

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<sup>33</sup> AirTouch has recently filed comments in support of a petition for rulemaking filed by Andrew Corporation seeking to modify the Commission's cellular rule requiring that cellular base station antennas transmit signals using solely vertical polarization. AirTouch demonstrated the benefits of using non-vertical polarized (*i.e.*, cross-polarized) antennas to minimize visual impacts, reduce costs, and increase efficiency. For example, a single cross-polarized antenna can replace 3-4 existing vertically-polarized antennas. *See* Comments of AirTouch Communications Inc., RM No. 9387 (Dec. 3, 1998).

<sup>34</sup> For example, SigmaOne and KSI indicated at the Commission roundtable discussion that they have not conducted tests with a single pole using cross-polarized antennas. TruePosition indicated that it conducted one test 4 years ago. U.S. Wireless stated simply that it was "natural for network design to have some problems in this area."

with only one or two sites in a network-based system. AirTouch agrees with Nortel in seeking clearly articulated and published test results.

Finally, as Western Wireless noted at the Commission roundtable, there are other significant costs involved with network solutions — notably the construction of up to 6 completely separate networks in markets with multiple carriers — which may not be viable from a cost or cost recovery perspective. There is also significant discrepancy as to the overall costs of each solution. Handset representatives believe the cost per subscriber to implement their solution to be \$7-10, while network proponents estimate the cost to be \$50-100 per subscriber. Conversely, network solutions are conservatively estimated to start at around \$20,000 per cell site. These cost discrepancies add to the confusion faced by carriers and the Commission in evaluating each solution.

### **III. CLAIMS REGARDING FLASH-CUT AVAILABILITY OF NETWORK SOLUTIONS FOR ALL SUBSCRIBERS AS OF OCTOBER 1, 2001, ARE HIGHLY MISLEADING**

The notion often espoused by network vendors that their solution will allow flash-cut implementation to all subscribers on October 1, 2001, while a handset solution must be phased-in over time, is highly misleading.<sup>35</sup> The October 1, 2001, date in the Commission's rules is triggered *only* if PSAPs have requested Phase II ALI information and are capable of using it, and a cost recovery mechanism is in place.<sup>36</sup> Based upon what is now known about Phase I, very few PSAPs are yet in a position to request this information.

From a practical standpoint, then, it is very likely that substantial numbers of PSAPs will not be in a position to request Phase II ALI information on October 1, 2001. Instead, requests from

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<sup>35</sup> See *generally* Comments of BellSouth at 2-3.

<sup>36</sup> See 47 C.F.R. § 20.18(f).

PSAPs will vary over time resulting in a phased-in approach for Phase II network solutions, as is currently the case with Phase I deployment. Thus, the idea of flash-cut availability of Phase II ALI on a date certain using a network solution is a misnomer — it will be phased-in as PSAPs see a need for location information and are in a position to request it. Handset solutions should be given similar flexibility to provide phased-in services.

#### **IV. THE RECORD REVEALS GROWING SUPPORT FOR THE USE OF CEP TO MEASURE ALI ACCURACY**

The record reflects growing recognition that the Root Mean Square (“RMS”) methodology is an inadequate means of measuring ALI compliance. For example, RMS methodology suffers from being poorly defined, resulting in oversimplified ALI accuracy requirements that lack the necessary sensitivity to adjust to even one inaccurate anomaly.<sup>37</sup> As a result, the record shows that RMS calculations are too easily skewed by the inclusion of a small number of highly inaccurate results, which will prevent a carrier from complying with the ALI requirement, even if the large majority of ALI measurements are less than the 125 meters required by the rule.<sup>38</sup> Circular Error Probability (“CEP”) does not suffer from these deficiencies and is a technology neutral methodology.<sup>39</sup> Accordingly, AirTouch reiterates its support for those commenters who advocate the use of CEP as the preferred means for measuring ALI accuracy.<sup>40</sup>

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<sup>37</sup> See Comments of RTG at 2; Omnipoint Technologies, Inc. (“OTI”) at 2.

<sup>38</sup> See Comments of ALLTEL at 3; PCIA at 7; RTG at 2.

<sup>39</sup> See Comments of ALLTEL at 3.

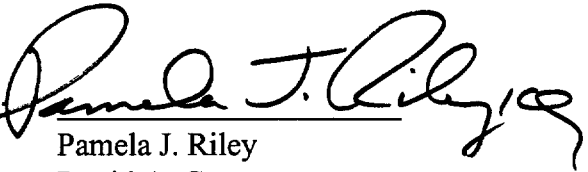
<sup>40</sup> See Comments of U S West at 9-10; PrimeCo at 7; BellSouth at 8; OTI at 2, 4-5; SnapTrack at 6; Southwest Research Institute (“SwRI”) at 1.

## CONCLUSION

For the reasons stated above and in AirTouch's previous filings, AirTouch respectfully requests that the Commission grant the pending waiver requests, or modify Section 20.18(e), to give carriers the flexibility to choose handset-based or hybrid Phase II ALI solutions, as well as network-based solutions, based upon the systems they have in place and what will best serve their customers. The public interest would be served by such Commission action.

Respectfully submitted,

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July 2, 1999

## CERTIFICATE OF SERVICE

I, Brooke Wilding, hereby certify that on this 2nd day of July, 1999, copies of the foregoing "Reply Comments of AirTouch Communications, Inc." in CC Docket No. 94-102, in response to DA 99-1049, were served by hand upon the following:

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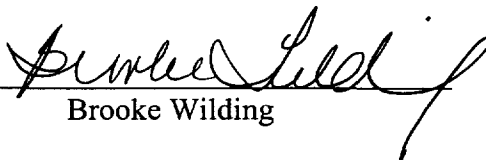
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